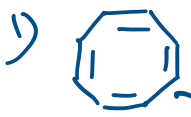
Organic jan 23

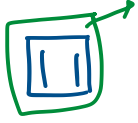
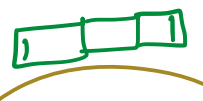
Monday, 23 January 2023 20:49

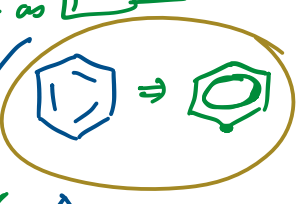
Applications of Aromaticity

① Bond length variation

Q:- Which of the following has equal length of Bonds between all Carbon?

1) 

2)  → exist as 

3) 

4) $C_{10}H_{10}$ → exist as

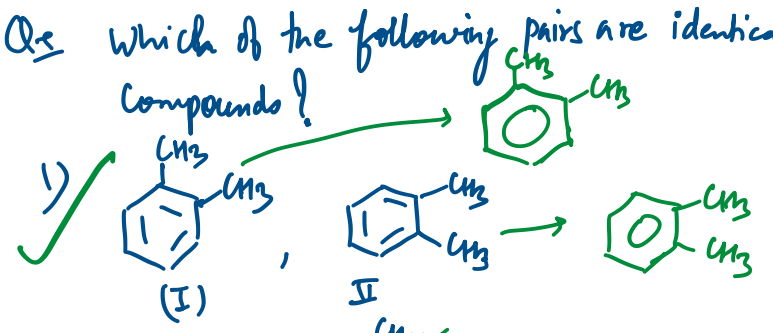
[10]-Annulene → non-planar

So, no resonance in complete ring

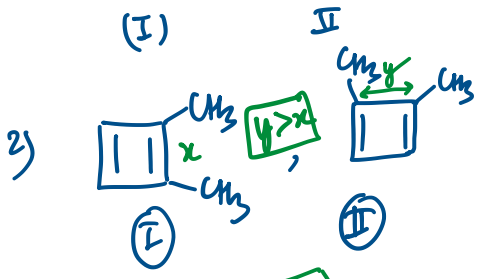
y > x

② Isomerism

Q:- Which of the following pairs are identical Compounds?

1) 

(I) , (II)

2) 

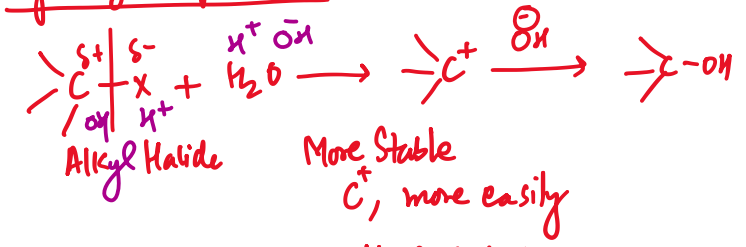
y ≠ x So, Different Bond Connectivity ⇓ Structural isomers

3)

(I) ⇄ (II) → Structural Isomers

4) All are pair of identical Comp.

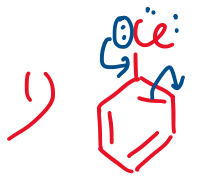
③ Hydrolysis of Halide



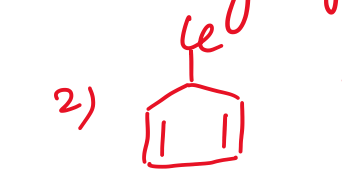
Alkyl Halide

More Stable C^+, more easily Alkyl Halide is Hydrolysed.

Q:- Which is most easily Hydrolysed?

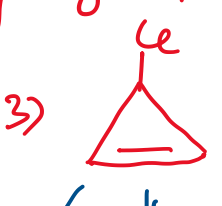
1) 

Partial double Bond → Difficult to Hydrolyse

2) 

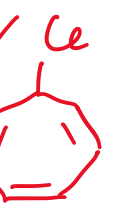
Cannot be Hydrolysed

A.A

3) 

Aro

So easily Hydrolysed

4) 

Cycloheptatrienyl Cation

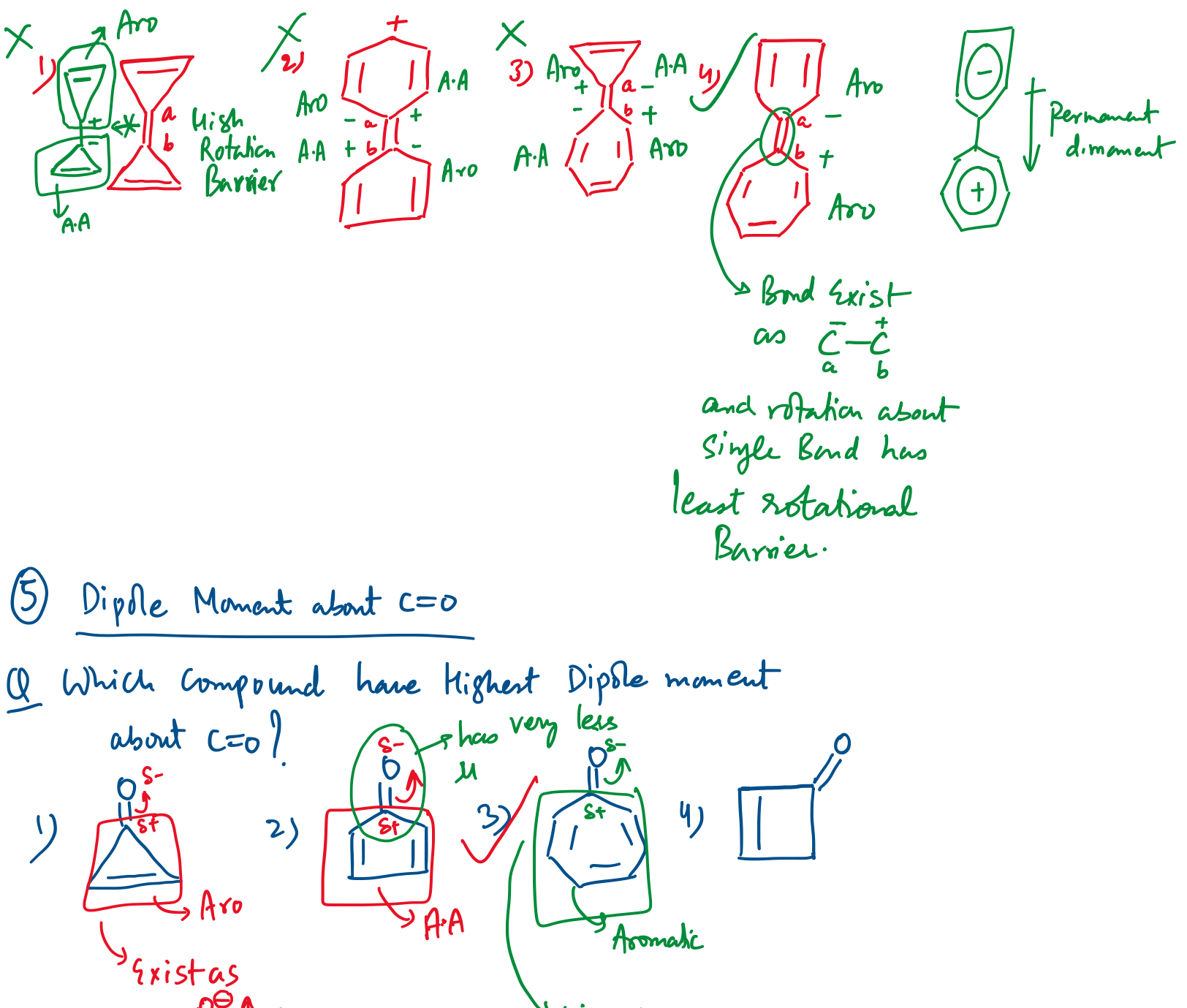
Aro (Most Stable)

Most easily Hydrolysed.

④ Rotation Barrier about C=C

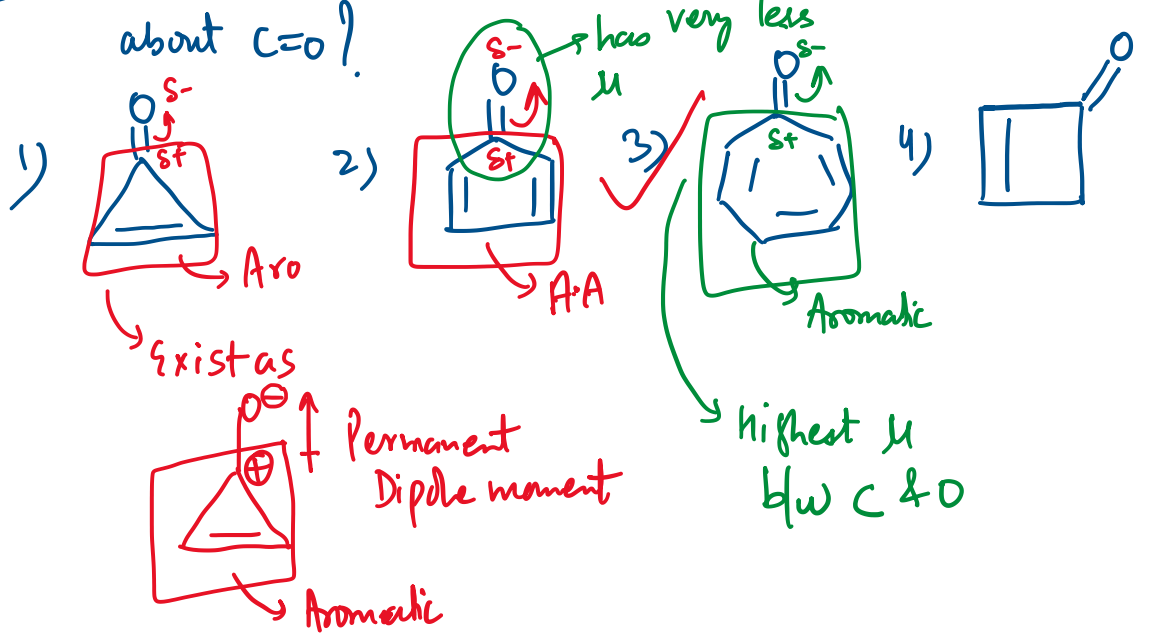
If C=C is converted to C–C & we get aromatic rings, then C=C exist as C-C and rotational Barrier is very small.

Q Which has least rotational Barrier about $\overset{a}{C}=\overset{b}{C}$?



(5) Dipole Moment about C=O

Q Which Compound have Highest Dipole moment about C=O ?



$(\mu_{C=O}) \Rightarrow$ 3 > 1 > 4 >> 2

(6) Acidic Strength

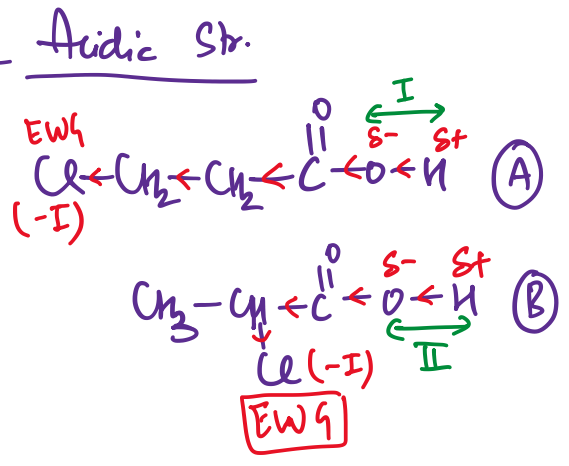
Strong Acid $\rightleftharpoons$ H^+ + Conjugate Base ; $K_a = \frac{[C.B][H^+]}{[Acid]}$ (or Kea)

Strong Acid ⇓ More reactivity ⇓ Easily give H^+

Conjugate Base ⇓ Stable ⇓ Weak ⇓ very less Reactive ⇓ Stabilised by EWG

more Acidic Strength, $[H^+]\uparrow$, $K_a\uparrow$, $pK_a\downarrow$ (ionization Const of Acid)

Q Acidic Str.

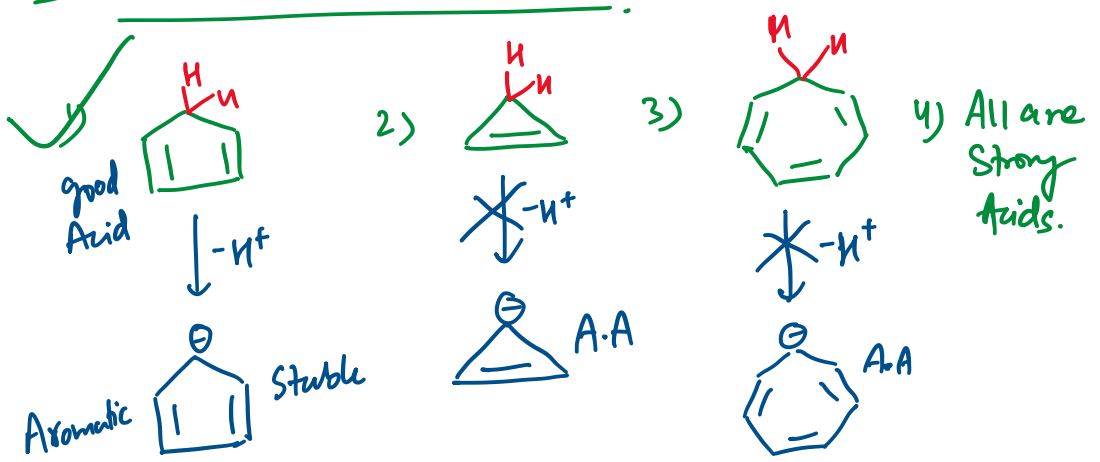


Dist ↓, I-Effect ↑

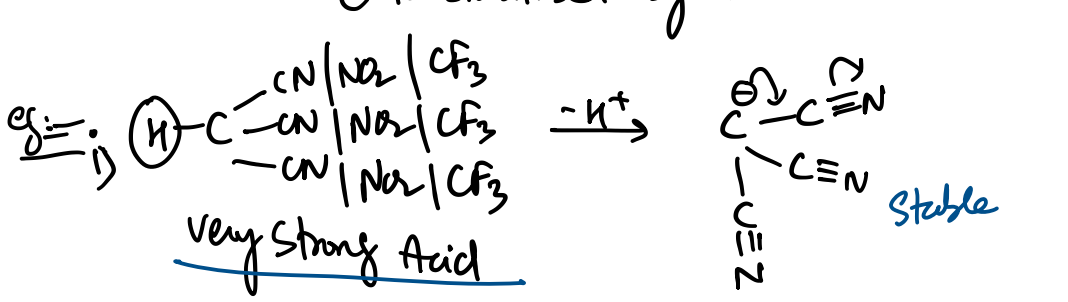
Q Which is more Weak Bond I & II ✓

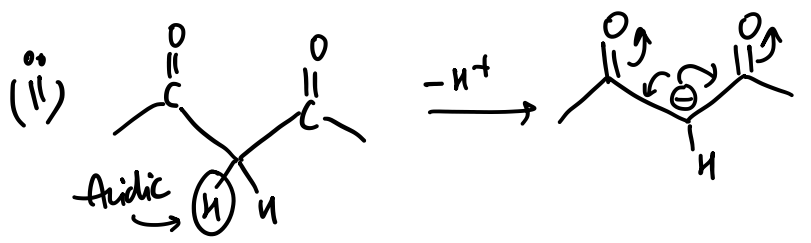
B is more acidic than A

Q1 Which is more Acidic (H)?

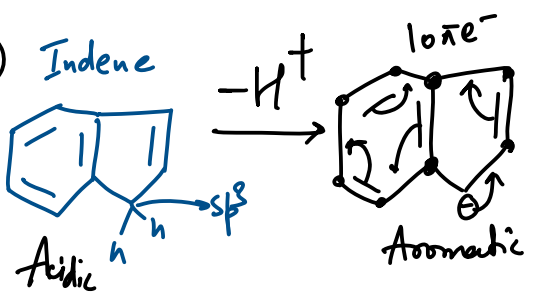


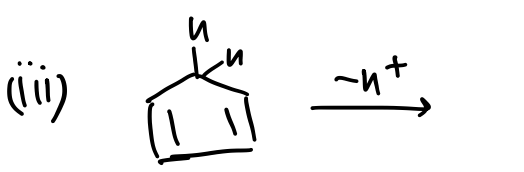
(**) Usually H attached to C is not very acidic. Acidic H can only be present at Carbon if EWG is attached to $C^\ominus$ or $C^\ominus$ is stabilised by Aromatic Character.



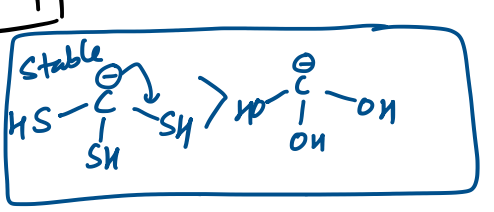


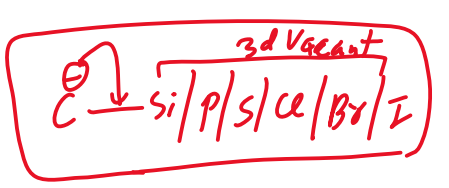
(#) Indene

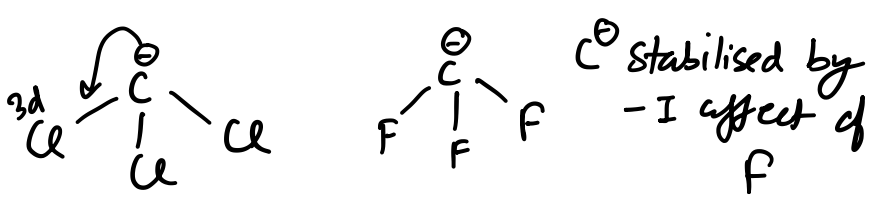




(iv) Chloroform fluoroform
$CHCl_3 > CHF_3$

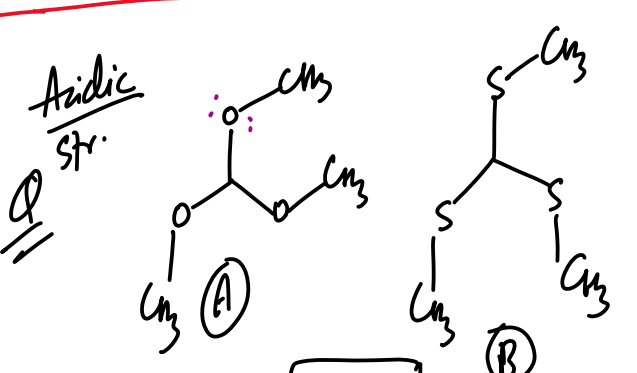






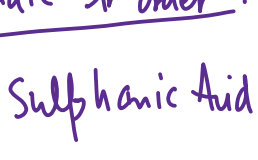
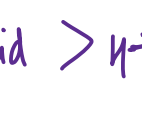
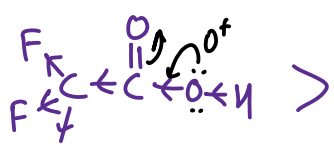
d-orbital resonance

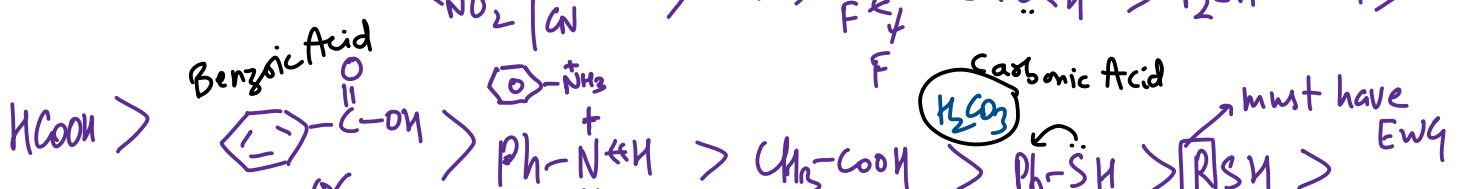
$C^\ominus$ Stabilised by -I effect of F

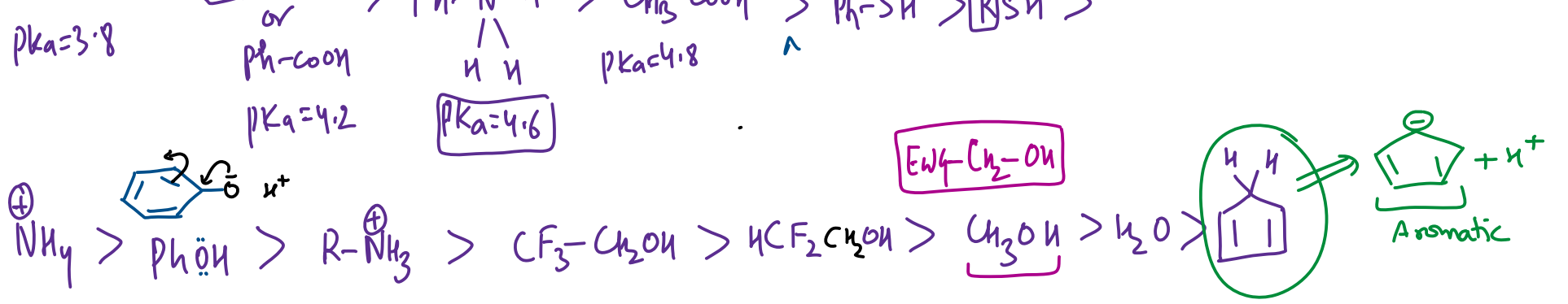


A < B

(#) Acidic Str. order :-

Sulphanic Acid >  >  >  > $F_2CH-COOH$ >





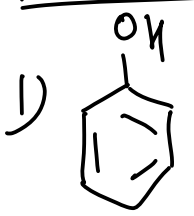
$RCH_2OH > R_2CHOH > R_3C-OH >$ Alkyne > Alkene.

Q11) Strogest Acid ?

1) $CHBr_3$ 2) ~~$CH(CN)_3$~~ ✓

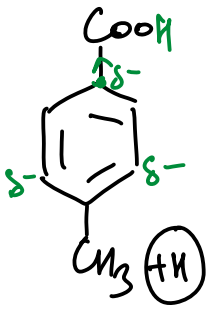
3) CHI_3 4) $CHCl_3$

Q13 Acidic Str.

1) 

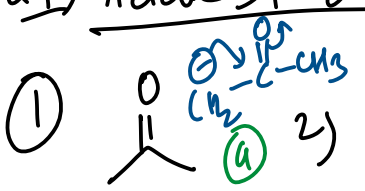
2)

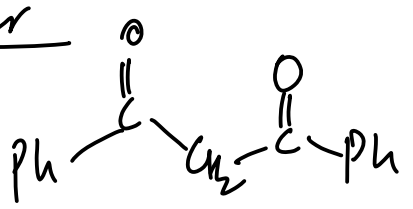
3)

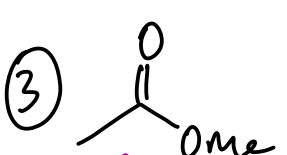
4) 

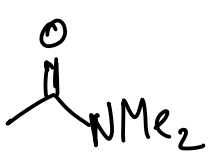
$1 < 4 < 3 < 2$

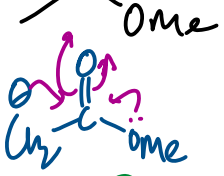
Q14) Acidic str. order

1) 

2) 

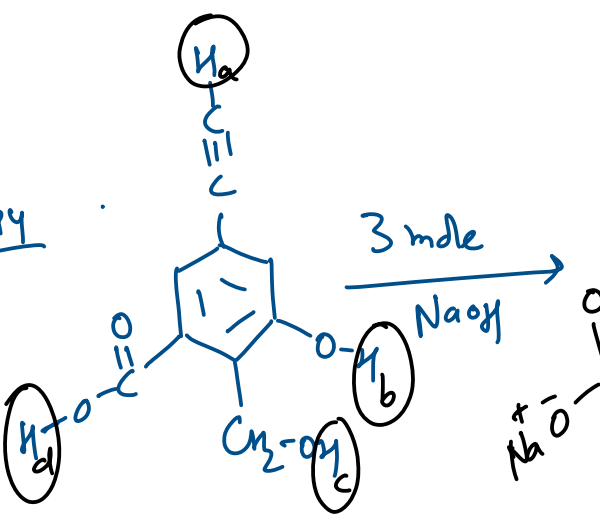
3) 

4) 



Acidic $2 > 1 > 3 > 4$

Q14

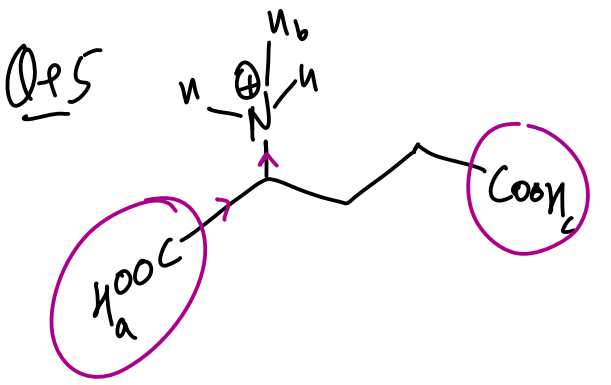


$H_d > H_b > H_c > H_a$

Stable of C.B

$a > b > c$

Q15

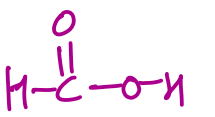


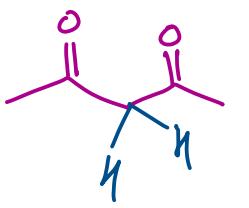
acidic Str

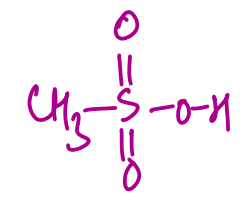
$H_a > H_c > H_b$

Q16 Acidic Str.

1)

2) 

3) 

4) 

4) > 2 > 1 > 3

BASIC Str.

↳ Tendency to capture $H^{\oplus}$ or reactivity towards H^+

Basic Str.

(#) $C^- > N^- > O^- > F^-$ Basic St. des L→R

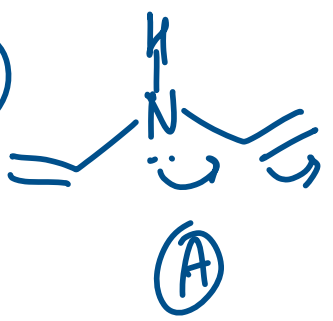
(#) $F^- > Cl^- > Br^- > I^-$

(#) $\ddot{N}H_3 > \ddot{P}H_3$

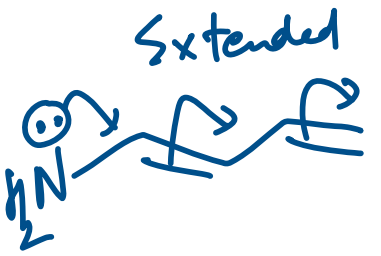
(#) $H_2\ddot{O}: > H_2S$

(#) $\overset{\ominus}{O}H > \overset{\ominus}{S}H$

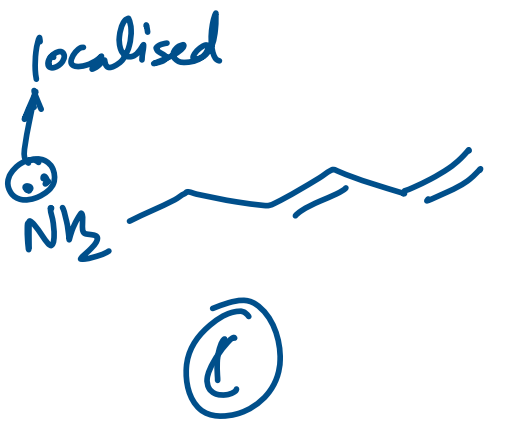
→ Basic str. ↓es down the group

(#) 

(A)



(B) → most Stable, less reactive towards H^+, less Basic



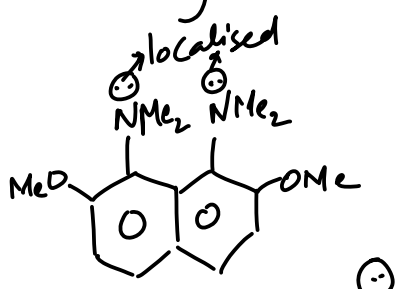
(C)

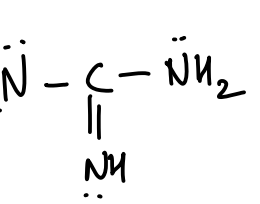
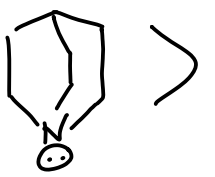
C > A > B

localised e^- more Basic than delocalised e^-.

(#) localised e^- density > delocalised e^- density

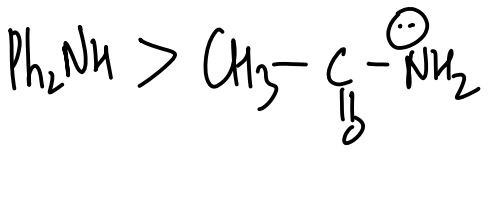
Basic strength order



>  >  >

ortho-derivative < other derivative

$R_3N > R_2NH >$ $> MeNH_2 > NH_3 >$ $>$ PhNHEt > Aniline & its derivatives

 $> CH_3-C\equiv N:$